FOT INSTRUMENT OPERATIONS PLANS

NELSON V. PINGITORE
Lockheed Martin Space Mission Systems

Goddard Space Flight Center/Code 505
Greenbelt, MD 20771 USA
E-mail: nping@eos.hitc.com

FOT Instrument Operations Plans

Topics to be Addressed

- Instrument OICDs
- Roles and responsibilities of IOTs and FOT
- Operations agreements

Operations Interface Control Documents

- OICDs between the IOTs and the FOT being developed
- Interactions between FOT and IOTs documented in OICDs
- OICDs shall document
  - Procedures for planning and scheduling of instrument activities
  - Planning product availability
  - Processes for submitting microprocessor loads
  - Constraints
  - Real-time interaction and commanding
  - Responses to limit violations and alarms
  - PDB population and prelaunch configuration item (CI) definitions
  - Contingency interactions (e.g., safehold recovery)
  - Instrument-unique operations agreements

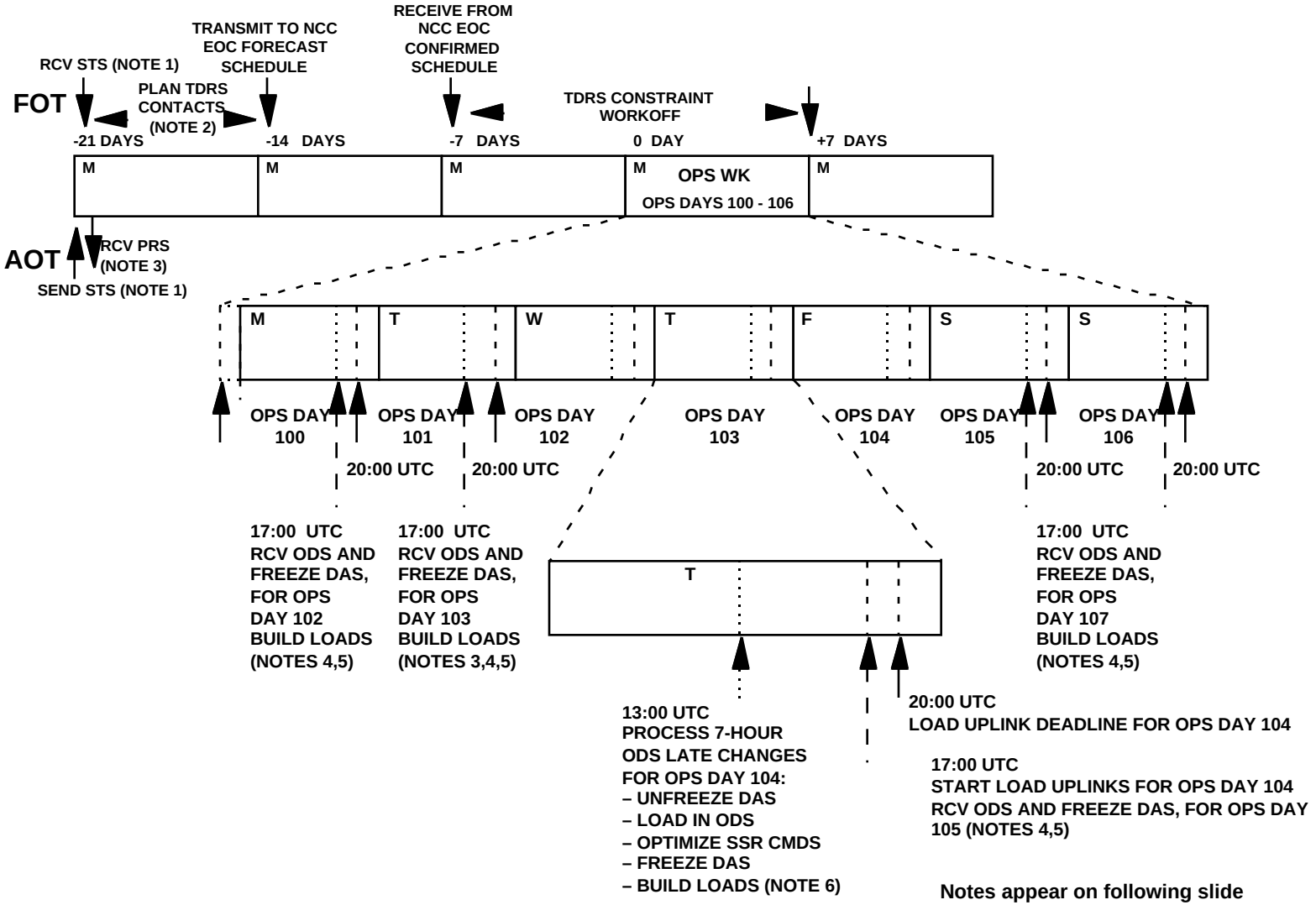
FOT Scheduling Roles and Responsibilities

- Focal point for all mission operations-related activities
- Coordinate overall mission schedule
- Notify Project Scientist of unresolved instrument conflicts
- Create planning products
- Notify instrument teams of updated planning products

IOT Scheduling Roles and Responsibilities

- Define activities required to perform instrument operations within constraints of system design and spacecraft requirements
- Define constraints and modes associated with activities
- Schedule detailed plan for each operations day via IST
  - IOTs must schedule their initial activities no later than 14 days prior to operations week
  - All schedule modifications by IOTs must be complete no later than 2 days prior to scheduled load uplink time
  - ASTER has a unique scheduling timeline
- Resolve all instrument-unique constraint violations
- Participate in resolution of all conflicts between scheduled activities and those of another instrument

ASTER Scheduling Timeline



Notes appear on following slide

IOT Real-Time Roles and Responsibilities

- No requirement to support routine real-time operations
- Define and verify command procedures – nominal and contingency
- Support real time via IST for
  - Planned instrument commanding
  - Contingency commanding
  - Contingency analysis
  - Verification of instrument status and operations
  - Maneuver configuration

ASTER IOT Real-Time Roles and Responsibilities

- Support all real-time contacts
- Define and verify command procedures – nominal and contingency
- Identify instrument anomalies
- Coordinate contingency commanding with FOT
- Execute contingency analysis
- Verify instrument status and operations

IOT Analysis Roles and Responsibilities

- Verify instrument status and operations
- Analyze instrument component
  - Short-term performance
  - Long-term trends
  - Statistical evaluation of trend data
- Investigate anomalies
- Update PDB items related to instrument performance
  - Telemetry calcurve
  - Telemetry limits
- Provide instrument sustaining engineering and maintenance for life of the instrument

FOT Instrument Operations

MISR

Instrument operates continuously

- Science Mode
  - Global Mode
  - Local Configuration (as req)
  - Engineering Configuration (dark side)
  - Calibration Configuration
    - Over poles (~13 min each once per month)
    - On dark side (~3 min once per month)

Command Requirements

- Instrument Computer
  - Memory load after power ON
- SCC
  - Stored command used to execute activities within 1 day window
  - TMONs (3)

MOPITT

Instrument operates continuously

- Science Mode (day & night)
- Calibration
  - Short Calibration with normal scan
  - Long Calibration (once/month)

Command Requirements

- Instrument Computer
  - loads as required
- SCC
  - Minimal stored command usage
  - TMONs (6)

ASTER (VNIR, SWIR, TIR)

operates limited time (day & night)

- V/S/T Observation Mode
  - preparation (~6.5 min)
  - observation (2 - 16 min)
  - stereo (1 min)
  - standby (40 sec)
- Other Science Modes (e.g,)
  - TIR (<21 min , night)
  - divided V/S/T (<19.5 min)
  - divided S/T (<25 min)
  - VNIR complete stereo (<18 min)
- Pointing Mode for VNIR & SWIR (part of obsv mode for TIR)
- Calibration Mode
  - every 17 days VNIR & SWIR (daytime)
  - every 17 days TIR long cal (nighttime)
  - TIR cal before and after each obsv

Command Requirements

- SCC
  - Activity, instrument operations & control CMDs/sequences all stored in SCC
    - Loaded once per day
    - Estimated SCC commands
      - 1800 ATC
      - 28 RTCS
  - TMONs (7)

CERES

Both Instruments operate continuously

- Cross track operating mode
  - continuous scan day & night
  - periodic (~2 weeks) calibration
- BiAxial operation
  - continuous scan, interupted twice per orbit with sun-avoidance "short scan"
  - periodic (~2 weeks) calibration

Command Requirements

- Instrument Computer
  - loads as required
- SCC
  - Short scan start/stop commands (loaded once per day)
  - TMONs (15)

MODIS

Instrument operates continuously

- Science Mode
  - All Bands during day (50% of orbit)
    Bands 20 - 36 during night (50% of orbit)
- Calibration
  - 17 internal cal activities as req using 3 targets and electronics changes (BB, SRCA, SD, ECAL)

Command Requirements

- Instrument Computer
  - loads as required
- SCC
  - Daily command load
  - TMONs (1)(TBR)